

REMARKS

In response to the above-identified Office Action, Applicants amend the application and seek reconsideration thereof. In this response, Applicants amend claims 9 and 43. Applicants do not cancel or add any new claims. Accordingly, claims 1, 4-9, 30, 33-44, 46, 48, 49, and 111-115 are pending in the application.

I. Claims Objected to Under 37 C.F.R. 1.75(c)

Applicants have amended claims 9 and 43 to further limit the subject matter of the claims from which these claims depend. The claims as amended further limit the element of at least one filler exhibiting a specific surface area greater than 1,000 m²/g to between 1,000 m²/g and 3,000 m²/g. Accordingly, reconsideration and withdrawal of the objections to claims 9 and 43 are requested.

II. Claims Rejected Under 35 U.S.C. § 103

Claims 1, 4-6, 8, 9, 33, 35-38, 41-44, 46, 48, 49, 112, 113, and 115 are rejected under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent No. 4,309,494 issued to Stockel (hereinafter "Stockel") in view of U.S. Patent No. 4,190,707 issued to Doi et al. (hereinafter "Doi") as evidenced by U.S. Patent No. 5,171,774 issued to Ueno et al. (hereinafter "Ueno"). Applicants respectfully disagree for the following reasons.

In order to establish a *prima facie* case of obviousness, the Examiner must show that the cited references combined teach or suggest each of the elements of a claim. The Examiner has listed as rejected over these references claims depending on independent claim 30 but has not listed independent claim 30 as rejected over these references. Applicants respond herein under the assumption that this is an error and that the Examiner intended to reject claim 30 over these references as well. In regard to independent claims 1 and 30, these claims include the elements of a filler exhibiting a specific service greater than 1,000 m²/g and the at least one filler as part of a porous composite product in the form of a film. The Examiner admits that Stockel does not teach a filler that exhibits a specific surface greater than 1,000 m²/g. Rather, the Examiner argues that

Stockel teaches a filler that is carbon black and relies upon Ueno for teaching that this carbon black inherently has a specific surface area of $1,475 \text{ m}^2/\text{g}$. However, Ueno teaches a PTC composition for use in a resettable fuse - not a separation device. The PTC filler composition disclosed in Ueno, specifically carbon black, is in the form of a chip not a film. See Ueno, col. 3, line 60. Thus, the Examiner has inappropriately relied upon Ueno for teaching a specific surface area of a filler being greater than $1,000 \text{ m}^2/\text{g}$ because the filler taught by Ueno is not part of a film as claimed in claims 1 and 30. Further, the Examiner has not established that a chip of carbon black is equivalent to carbon black filler in a film.

One of ordinary skill in the art would not combine the teachings of Stockel and Ueno to utilize the PTC composition of Ueno in a separator for a liquid electrolyte battery that is formed of a porous film because the PTC composition of Ueno is in an inappropriate form, namely, in the form of a chip. Also, Stockel and Ueno teach devices with different applications and uses. Stockel teaches a battery separator film whereas Ueno teaches a resettable fuse. Ueno teaches using a filler to make a composition highly electrically conductive, see col. 1, lines 16-18, col 2, lines 3-5, col. 4, lines 42-46, and to improve its PTC characteristics. See col. 6, lines 26-31. One of ordinary skill in the art would understand that battery separators are not electrically conductive because their function is to electrically isolate two opposite electrodes in order to prevent a short circuit between them. See, for example, Stockel, col. 1, lines 17-20. Thus, one of ordinary skill in the art would not attempt to combine the filler taught by Ueno with the separator film of Stockel because the separator film in the primary reference of Stockel must not be electrically conductive and such a combination would produce an electrically conductive composite product.

Applicants also note that Stockel indicates that "a separator should have a low electrical resistance." See col. 1, lines 28-29, and col. 3, lines 27-30. However, one of ordinary skill in the art would understand that the wording "electrical resistance" used in the context of Stockel would be known to those of ordinary skill in the art to mean "ionic resistance." One of ordinary skill in the art would understand that battery separators must be electrically insulating and ionically conductive. These separators have a very high electrical resistance but a low ionic resistance.

Thus, one of ordinary skill in the art would understand that when Stockel uses the term "electrical resistance," Stockel actually means "ionic resistance" and is utilizing the term "electric resistance" in an unorthodox manner.

Further, Stockel and Ueno cannot be combined to teach a porous composite product as claimed because Stockel teaches forming a porous separator by an extrusion removal process which consists of mixing together polymers, filler and plastizer and then extracting the filler and the plasticier. See col. 2, lines 53-57 of Stockel. Stockel teaches the porosity of the separator is generated by extraction of a filler. See col. 3, lines 44-46 and lines 61 and 62 of Stockel. Thus, the porous separator taught by Stockel contains very little filler because it has been removed in order to form pores. The passage of Stockel referenced by the Examiner, col. 4, lines 30-32, teaches the composition of an initial mixture before the extraction step is implemented. Thus, even if carbon black from Ueno is combined with the process of Stockel as a filler to make a porous film this carbon black would be removed during the extraction step taught by Stockel. The resulting composite product would be a porous separator having very little filler. Thus, Stockel in combination with Ueno would not teach a product containing at least 20% by weight filler as claimed in claims 1 and 30. Therefore, Stockel does not teach the element of a filler having specific surface area greater than 1,000 m²/g or a composite product at least 20% by weight filler and Ueno can neither be combined with Stockel to cure this defect nor be relied upon for inherently teaching that the carbon black of Stockel teaches a filler that exhibits a specific surface area greater than 1,000 m²/g.

Further, the Examiner has not indicated and Applicants have been unable to discern any part of Doi that cures these defects of Stockel and Ueno. The Examiner has not indicated and Applicants have been unable to discern any part of Doi that either teaches a filler as part of a composite product in the form of a film or a filler that exhibits a specific surface area greater than 1,000 m²/g. Therefore, Stockel in view of Doi and as evidenced by Ueno does not teach or suggest each of the elements of independent claims 1 and 30. Accordingly, reconsideration and withdrawal of the obviousness rejection of claims 1 and 30 are requested.

In regard to claims 4-6, 8, 9, 33, 35-38, 41-44, 46, 48, 49, 112, 113, and 115, these claims depend from independent claims 1 and 30 and incorporate the limitations thereof. Thus, at least for the reasons mentioned above in regard to claims 1 and 30 these claims are not obvious over Stockel in view of Doi and as evidenced by Ueno. Accordingly, reconsideration and withdrawal of the obviousness rejection of claims 4-6, 8, 9, 33, 35-38, 41-44, 46, 48, 49, 112, 113, and 115 are requested.

Claims 1, 4-9, 30, 33-38, 40-44, 46, 48, 49, 111-113 and 115 stand rejected under 35 U.S.C. § 103 as being unpatentable over U.S. Patent No. 4,957,943 issued to McAllister et al. (hereinafter "McAllister") in view of Doi and as evidenced by Ueno. Applicants respectfully disagree for the following reasons.

Similar to the rejection based on Stockel, Doi, and Ueno, the Examiner rejects independent claims 1 and 30 based McAllister as a primary reference utilizing carbon black as a filler and relies on Ueno for teaching that carbon black has a specific surface greater than 1,000 m²/g. As argued above in regard to the rejection primarily based on Stockel, Ueno cannot be relied on to inherently teach a specific surface area of a filler as part of a film because Ueno teaches that chips of carbon black have a specific surface area of 1,475 m²/g but does not teach a filler as part of a film that exhibits specific surface area greater than 1,000 m²/g.

Further, McAllister does not disclose a product having a homogenous structure as claimed in claims 1 and 30. Rather, McAllister describes a process wherein a product is expanded by inflation which is called a "bubble process." See col. 10, lines 36-42 of McAllister. This type of bubble process does not result in a product that is homogenous. Specifically, McAllister does not teach a product that is homogenous in the direction of its expansion. Thus, McAllister also does not teach these elements of claims 1 and 30.

Similar to the possible combination of Stockel and Ueno, one of ordinary skill in the art would not combine the teachings of McAllister and Ueno because McAllister and Ueno teach products with distinct applications and uses. McAllister teaches filters, diffusion barriers and battery separators while Ueno teaches a resettable fuse. As discussed above, Ueno teaches a filler

in the form of carbon black that allows a composition to be highly conductive and to improve its PTC characteristics. For the same reasons set forth in regard to Stockel and Ueno, one of ordinary skill in the art would not think of combining the filler taught by Ueno with a filter, diffusion barrier or separator as taught by McAllister because filters and diffusion barriers are not required to be electrically conductive and separators must not be electrically conductive and they must not have PTC characteristics. Thus, Ueno would not be combined with McAllister by one of ordinary skill in the art.

Doi does not cure the defects of McAllister and Ueno. The Examiner has not indicated and Applicants have not be able to discern any part of Doi that teaches or suggests a filler having a specific surface area greater than 1,000 m²/g in a film product or a composite product with a homogenous structure. Further, one of ordinary skill in the art would not think to combine McAllister with Doi because Doi teaches away from such a combination.

Doi teaches a battery separator made of a porous film where the mean diameter of the pores is less than 0.5 micrometers. See col. 4, lines 27 and 28 of Doi. Doi indicates that its battery separator achieves a "low electrical resistance." See col. 5, line 61. However, Doi also misuses the term "electrical resistance" and, in fact, it would be more accurate to state that the battery separator of Doi achieves a low "ionic resistance" because, as explained above in regard to the misuse of this term in Stockel, separators must not be electrically conductive or short circuits would occur between electrodes in a battery. Doi teaches away from being combined with McAllister because the low ionic resistance of the separator of Doi is obtained by forming pores by extracting the filler. See col. 5, lines 61-62. Doi teaches extracting inorganic fillers contained in an initial composition. See, for example, col. 5, lines 61-62, and col. 7, lines 2-3 of Doi. Extraction of inorganic filler particles produces the desired pore size in a separator. See col. 5, lines 19-22 of Doi. However, the process of extracting a filler leads to final separator wherein the filler is less than 3 percent by volume of the product. See col. lines 33-38 of Doi. Thus, combining McAllister and Doi would result in a separator having no filler or almost no filler.

Therefore, McAllister combined with Doi does not teach a product that contains at least 20% by weight fillers as claimed in claims 1 and 30.

Also, McAllister, Ueno, and Doi do not teach a final product with a specific surface area greater than $10 \text{ m}^2/\text{g}$ as claimed in claims 1 and 30. The Examiner states in the Office Action mailed November 26, 2003 on page 5 that a BET specific surface greater than $10 \text{ m}^2/\text{g}$ would be inherently present because the self supporting film of McAllister is made of the same material, has a similar composition and is produced by the same process as claimed in the invention. However, the process taught by McAllister consists of forming a colloidal dispersion of fillers in a liquid and melt-blending the colloidal dispersion with a thermal plastic polymer. See col. 12, lines 54-57, and col. 5, lines 9-31. Thus, contrary to the assertions of the Examiner, the process taught by McAllister is not an extrusion removal process from which the claimed invention results. Thus, the Examiner has not established that the process taught by McAllister would lead to a product having the elements of the claimed invention including having a specific surface area greater than $10 \text{ m}^2/\text{g}$. Therefore, the Examiner has failed to establish that McAllister in view of Doi and evidenced by Ueno teaches or suggests each of the elements of claims 1 and 30. Accordingly, reconsideration and withdrawal of the obviousness rejection of claims 1 and 30 are requested.

In regard to dependent claims 4-9, 33-38, 40-44, 46, 48, 49, 111-113 and 115, these claims depend from independent claims 1 and 30 incorporate the limitations thereof. Thus, at least for the reasons mentioned in regard to claims 1 and 30 these claims are not obvious over McAllister in view of Doi and evidenced by Ueno. Accordingly, reconsideration and withdrawal of the obviousness rejection of these claims are requested.

Claims 39 and 114 stand rejected under 35 § U.S.C. 103(a) as being unpatentable over McAllister in view of Doi as evidenced by Ueno and in further view of U.S. Patent No. 4,100,238 issued to Shinomura (hereinafter "Shinomura"). Applicants respectfully disagree for the following reasons.

Claims 39 and 114 depend from independent claims 1 and 30 and incorporate the limitations thereof. Thus, for the reasons mentioned above in regard to the rejection of claims 1

and 30 over McAllister in view of Doi and evidenced by Ueno, claims 39 and 114 are not obvious over these references. Shinomura does not cure the defects of McAllister, Doi and Ueno. The Examiner has not indicated and Applicants have been unable to discern any part of Shinomura that teaches a filler having a specific surface area of greater than 1,000 m²/g, an overall composite product that exhibits a "BET" specific surface area greater than 10 m²/g or a polymeric material having at least 20 percent by weight of a filler as claimed in claims 1 and 30. Thus, McAllister in view of Doi, Ueno and Shinomura does not teach or suggest each of the elements of claims 39 and 114. Accordingly, reconsideration and withdrawal of the obviousness rejection of these claims are requested.

CONCLUSION

In view of the foregoing, it is believed that all claims now pending, namely claims 1, 4-9, 30, 33-44, 46, 48, 49 and 111-115 patentably define the subject invention over the prior art of record, and are in condition for allowance and such action is earnestly solicited at the earliest possible date. If the Examiner believes that a telephone conference would be useful in moving the application forward to allowance, the Examiner is encouraged to contact the undersigned at (310) 207 3800.

Respectfully submitted,

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Dated: 1/26, 2004

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1-26-04
January 26, 2004